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# Four New Frogs of the Genus *Eleutherodactylus* (Leptodactylidae) from Cuba

By Albert Schwartz[1]

Dunn (1926, p. 210) placed the Cuban *Eleutherodactylus* in four major groups, as follows: (1) The *auriculatus* group, containing *E. auriculatus, E. sonans, E. eileenae,* and *E. varians,* all of which are characterized by enlarged digital discs, rugose belly, and short vomerine tooth series; (2) the *dimidiatus* group, containing *E. dimidiatus* and *E. emiliae,* characterized by smooth skin above and below, long vomerine tooth series, very feebly developed digital discs, black cheek patch, and gray or tan color; (3) the *varleyi* group, containing *E. varleyi,* which is characterized by short vomerine tooth series, rugose belly, feebly developed discs, a granular dorsolateral fold, and a pectoral vocal sac; and (4) the *ricordi* group, containing *E. cuneatus, E. brevipalmatus, E. sierramaestrae, E. greyi, E. pinarensis, E. ricordi, E. casparii, E. gundlachi,* and *E. atkinsi,* characterized by rugose dorsum, long vomerine tooth series, smooth or feebly rugose belly, and digital discs feebly developed or restricted to the outer two fingers. Later, Barbour and Shreve (1937) described five new forms from Cuba (*E. turquinenis, E. albipes, E. intermedius,* and *E. parvus* as species, and *E. atkinsi orientalis*). Barbour (1942, p. 179) changed the name of *E. parvus* to *E. cubanus,* because the former name is preoccupied; the same author (1937) regarded Dunn's *E. sonans* as a subspecies of *E. auriculatus* with subspecies also on Hispaniola, Puerto Rico, St. John, and Tortola. Shreve (1945, p. 117) restricted the name *E. r. ricordi* to the distinctive members of this species that inhabit the highlands of Oriente, and regarded the

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name *E. r. planirostris* as correct for the more widespread lowland form. He also suggested that *E. casparii* of the Trinidad Mountains in Las Villas should be regarded as a subspecies of *E. ricordi;* this suggestion has been followed by Goin (1955). Alayo (1955) arranged the Cuban members of *Eleutherodactylus* into Dunn's four groups; his list, brought up to date nomenclatorially, I consider to be essentially correct (although subject to future modification) and is as follows:

*auriculatus* group
- *E. auriculatus auriculatus* Cope, 1862
- *E. auriculatus sonans* Dunn, 1925
- *E. varians* Gundlach and Peters, 1864
- *E. eileenae* Dunn, 1926

*dimidiatus* group
- *E. dimidiatus* Cope, 1862
- *E. emiliae* Dunn, 1926
- *E. intermedius* Barbour and Shreve, 1937
- *E. albipes* Barbour and Shreve, 1937
- *E. cubanus* Barbour, 1942

*varleyi* group
- *E. varleyi* Dunn, 1925

*ricordi* group
- *E. ricordi ricordi* Duméril and Bibron, 1841
- *E. ricordi planirostris* Cope, 1862
- *E. ricordi casparii* Dunn, 1926
- *E. cuneatus* Cope, 1862
- *E. brevipalmatus* Schmidt, 1920
- *E. sierramaestrae* Schmidt, 1920
- *E. gundlachi* Schmidt, 1920
- *E. atkinsi atkinsi* Dunn, 1925
- *E. atkinsi orientalis* Barbour and Shreve, 1937
- *E. greyi* Dunn, 1926
- *E. pinarensis* Dunn, 1926
- *E. turquinensis* Barbour and Shreve, 1937

There are now 22 forms of the genus accepted as occurring on Cuba. I have examined material representing all these forms in the collections of the Museum of Comparative Zoölogy, the American Museum of Natural History, Chicago Natural History Museum, Museum of Zoology of the University of Michigan, Academy of Natural Sciences of Philadelphia, Carnegie Museum, Charleston Museum, and United States National Museum. This material includes not only types and paratypes of 17 forms, but also specimens available to previous workers. A revision of the Cuban members of the genus is currently under way, so that more detailed comments will be withheld until a future date.

However, I doubt that *E. sonans* should be regarded as a subspecies of *E. auriculatus,* and that *E. brevipalmatus* and *E. sierramaestrae* are two distinct forms. Also, the relationships between *ricordi, casparii,* and *planirostris* are at present not clear. Collection of fresh material will assist in an evaluation of these and other problems.

During a recent collecting trip to the provinces of Habana and Pinar del Río, 149 *Eleutherodactylus* were secured. Color notes in life and Kodachrome photographs of representative specimens were taken. Study of this material demonstrates that three new forms are present in the collection. I have also been graciously given the opportunity by Mr. Thomas M. Uzzell, Jr., and Mr. Richard E. Etheridge to study and describe a new form from collections made independently by each of them while stationed at the United States Naval Base at Guantánamo Bay, Oriente, during the past four years. In Cuba I have had the able assistance of Mr. John R. Feick and Mr. William H. Gehrmann, Jr.; Mr. Gehrmann has taken the Kodachrome photographs of fresh specimens which have proved invaluable in study of the preserved material. I wish to thank both these men for their hearty cooperation and companionship in the field, as well as Mr. Uzzell and Mr. Etheridge for the data they have given me on their collections and for allowing me to describe the new species from eastern Oriente.

The following curators have allowed me both to examine specimens at their institutions and to borrow important material; I wish to thank them for the many courtesies extended me: Mr. Charles M. Bogert, the American Museum of Natural History (A.M.N.H.); Dr. James Boehlke, Academy of Natural Sciences of Philadelphia (A.N.S.P.); Mr. E. Milby Burton and Miss Emma B. Richardson, Charleston Museum (Ch.M.); Mr. Neil D. Richmond, Carnegie Museum (C.M.); Dr. Robert F. Inger, Chicago Natural History Museum; Mr. Arthur Loveridge and Dr. Ernest A. Williams, Museum of Comparative Zoölogy (M.C.Z.); Dr. Norman E. Hartweg and Mr. Thomas M. Uzzell, Jr., Museum of Zoology, University of Michigan (U.M.M.Z.); and Dr. Doris M. Cochran, United States National Museum (U.S.N.M.).

The members of the *auriculatus* group (*auriculatus, sonans, eileenae,* and *varians*) are widespread throughout Cuba. *Eleutherodactylus varians* is known only from the vicinity of Soledad, Las Villas Province; *sonans* and *eileenae* occur over the entire island; *auriculatus* has been recorded only from Oriente. In the vicinity of San Vicente, two specimens (one adult, one small juvenile) of a new form belonging to this group were collected by Feick, Gehrmann, and Schwartz in December, 1956. Comparison of these specimens with representatives of the re-

maining members of the *auriculatus* group on Cuba shows that these two specimens represent a new species. The tiny individual is so small that the characters of the new form, other than the enamel-white interocular bar, are impossible to ascertain. However, the adult specimen is so distinct that I have no hesitancy in describing it. I take great pleasure in naming this form for Mr. William H. Gehrmann, Jr., in recognition of his assistance and companionship in the field.

**Eleutherodactylus gehrmanni,** new species

Figure 1

TYPE: A.M.N.H. No. 59828, female, taken December 21, 1956, at San Vicente, Pinar del Río Province, Cuba, by John R. Feick, William H. Gehrmann, Jr., and Albert Schwartz. Original no. 1210.

DISTRIBUTION: Known only from the type locality.

DEFINITION: An *Eleutherodactylus* of the *auriculatus* group with enlarged digital discs, vomerine teeth in two short series, and a drab tan dorsum, hind legs with pale yellow bands and anterior faces of thighs dull brownish purple, and a white interocular bar bordered anteriorly and posteriorly with black.

DESCRIPTION OF TYPE: A female, with the following measurements: snout to vent length, 23.0 (all measurements in millimeters); head length (tip of snout to posterior margin of tympanum), 9.2; head width, 9.8; diameter of tympanum, 1.5; diameter of eye, 3.2; femur, 12.0; tibia, 13.7; length of fourth toe, 10.7; naris to eye, 2.3. Head slightly broader than distance from snout to tympanum; snout slightly rounded, naris prominent; diameter of eye larger than distance between naris and eye; interorbital distance slightly smaller than diameter of eye; dorsum feebly and indistinctly granular, with a fine raised median line from snout to sacrum; upper eyelids with both large and small granules; diameter of tympanum about half of the diameter of the eye; distance from eye to tympanum about half of the diameter of the latter. Digital discs large and present on tips of all fingers and toes, the discs on the two outer fingers larger than those on the two inner ones; disc of third finger about two-thirds of the diameter of tympanum. Fingers relatively long and slender, unwebbed, 3-2-4-1 in order of decreasing length; subarticular tubercles well developed. Toes long and slender, unwebbed, 4-3-5-2-1 in order of decreasing length. Heels overlap when femora are held at right angles to body. Venter strongly granular; throat smooth, under side of thighs strongly granular. Belly disc feebly developed, with a rather indistinct fold between the axillae, and a slightly more prominent fold across belly anterior to hind limbs.

FIG. 1. *Eleutherodactylus gehrmanni,* new species, holotype, A.M.N.H. No. 59828, female, from San Vicente, Pinar del Río Province, Cuba. Enlarged; actual snout-to-vent length 23.0 mm.

Tongue ovoid, slightly notched and free posteriorly, densely papillate anteriorly. Vomerine teeth in two short, straight series, extending from the choanae posteromedially; anterior end of vomerine series separated from choana by about the diameter of the latter; medial ends of vomerine series widely separated by a distance equal to about three-fourths of the length of each individual series.

COLORATION OF TYPE (FROM KODACHROME OF FRESH SPECIMEN): Dorsum more or less uniformly dull tan (pl. 13, A2; all color designations

from Maerz and Paul, 1950), somewhat darker on snout; a bold, white, interocular bar, extending from margin of eyelids on anterior third, widening in interocular space, and margined with black, the anterior black edge less prominent than the posterior. Black canthal line from snout through upper eyelid, thence from posterior corner of eye above tympanum to well anterior to insertion of forelimb; upper jaw and subocular area strongly mottled with black. Brachium uniformly gray, antibrachium with ground color dull tan and three black, poorly defined cross bars; fingers likewise banded with black. Anterior face of thighs dull brownish purple (pl. 15, A5), sharply distinct from dull tan ground color of dorsum of thigh; four pale yellow cross bars on both the femur and tibia, relatively obvious in life and poorly shown in preserved specimen; plantar surface of foot dusky, set off boldly from light tan dorsal surface. Venter pearly white, with scattered black chromatophores on belly, more dense on throat and organized into black blotches on lip; ventral surfaces of femora and tibiae more densely mottled with brownish; ventral surfaces of brachium and antibrachium immaculate white.

COMPARISONS: *Eleutherodactylus gehrmanni* requires comparison only with the four remaining members of the *auriculatus* group; it may be distinguished from Cuban *Eleutherodactylus* of other groups by having a combination of heavily granular venter, short vomerine series, and enlarged, almost *Hyla*-like digital discs. *Eleutherodactylus gehrmanni* differs from *E. a. sonans* in that the former is much larger; *E. a. sonans* is a tiny form, with snout-to-vent length less than 20 mm. *Eleutherodactylus a. sonans* has a light snout (dark in *gehrmanni*) and often a middorsal light line. *Eleutherodactylus varians* is but poorly known, and then only from the vicinity of Soledad, Las Villas. I have seen five specimens (U.M.M.Z. No. 98022) from mountains between headwaters of La Cieba, Oriente Province, that have been identified as this species only doubtfully. A female cotype of *E. varians* (M.C.Z. No. 11621) is larger than *E. gehrmanni* (snout-to-vent length, 26.3), has a larger eye (3.8), and relatively shorter femur (11.5) and tibia (11.9). All semblance of color and pattern has disappeared, and the frog is almost uniformly a light faded tan, with no indication of interocular bar or bands on the hind legs.

*Eleutherodactylus eileenae* is known from Pinar del Río and Las Villas Provinces. It is an exceptionally variable form, ranging from individuals with a very light dorsal zone, bordered on the sides with darker brown, to individuals with a pale, sharp, and almost geometrical band extending from the snout to the vent on the dorsal midline,

distinctly set off from the adjacent lighter dorsal zone. The dorsum is distinctly warty, thus very different from the indistinctly granular dorsum of *E. gehrmanni*. No specimens of *E. eileenae* that I have examined possess an interocular bar, the snout usually being noticeably lighter than the dorsum in this species. The hind limbs of *E. eileenae* are banded as in *E. gehrmanni,* and in this the two forms are similar.

Comparison of *E. gehrmanni* with *E. a. auriculatus* shows that the latter is a larger leptodactylid, adult females reaching a snout-to-vent length of 40 mm., and adult males 30.2 mm. The head of *E. a. auriculatus* is distinctly wider than the body, with very large eyes, the entire aspect quite *Hyla*-like, a resemblance that the large digital discs enforce. Occasional specimens of *auriculatus* possess a broad interocular pale bar, the color of which is unknown, but which may be white as in *E. gehrmanni*. The hind limbs are without pattern in all specimens, and the frog appears more stocky than the more delicate *E. gehrmanni*.

REMARKS: The type and small juvenile of *E. gehrmanni* were taken in the vicinity of San Vicente, Pinar del Río; both were taken on the ground, although the large digital discs suggest an arboreal rather than a terrestrial habitat. It is possible that *E. gehrmanni* is the western Cuban representative of the eastern *E. a. auriculatus,* but additional specimens of both forms, taken in the field and carefully photographed, will be necessary before the relationships of *E. gehrmanni* to the remainder of the *auriculatus* group can be clarified.

On December 26, 1956, Feick, Gehrmann, and I tore apart a large pile of palm-frond trash lying at the side of the road between San Vicente and Puerto Esperanza, Pinar del Río Province. This pile of trash housed *Anolis s. sagrei, Norops ophiolepis, Sphaerodactylus cinereus, Eleutherodactylus r. planirostris,* and three individuals of a new species of the latter genus, which are named and described below.

### **Eleutherodactylus phyzelus,** new species

Figure 2

TYPE: A.M.N.H. No. 59832, female, taken December 26, 1956, 4.4 miles northwest of San Vicente, on road between San Vicente and Puerto Esperanza, Pinar del Río Province, Cuba, by John R. Feick and William H. Gehrmann, Jr. Original no. 1410.

DISTRIBUTION: Known only from the type locality.

DEFINITION: A small *Eleutherodactylus* of the *dimidiatus* group lacking digital discs, aspect very toad-like, with very short hind legs, vomerine teeth in two short rows, dorsal pattern varying between a rather uniform reddish brown to a more complex pattern of a fine, pale

FIG. 2. *Eleutherodactylus phyzelus,* new species, holotype, A.M.N.H. No. 59832, female, from 4.4 miles northwest of San Vicente, on road between San Vicente and Puerto Esperanza, Pinar del Río Province, Cuba. Enlarged; actual snout-to-vent length 15.0 mm.

hairline from the snout to the vent, with a gray band on each side, this in turn bordered by a reddish tan zone from the upper eyelid to the hind legs.

DESCRIPTION OF TYPE: A female, with the following measurements: snout to vent, 15.0; head length (tip of snout to posterior margin of tympanum), 5.0; head width, 4.8; diameter of tympanum, 0.9; diameter of eye, 1.8; femur, 5.7; tibia, 6.3; length of fourth toe, 6.3;

naris to eye, 1.4. Head slightly narrower than distance from snout to tympanum; snout truncate, nares inconspicuous; diameter of eye greater than distance between naris and eye; interorbital distance equal to diameter of eye; dorsum smooth or irregular, but not warty or granular; upper eyelids with large, flattened, inconspicuous tubercles; diameter of tympanum greater than one-half of diameter of eye; distance from eye to tympanum equal to diameter of latter. Digital discs absent, the digits ending in a gray, terminal, unexpanded pad. Fingers short and slender, unwebbed, 3-2-4-1 in order of decreasing length; subarticular tubercles well developed. Toes short and slender, unwebbed, 4-3-2-5-1 in order of decreasing length. Heels barely touch when femora are held at right angles to the body. Venter and throat smooth; under side of thighs strongly granular. Belly disc feebly developed, with an indistinct fold between the axillae and an equally indistinct fold across the belly anterior to the hind limbs. Tongue ovoid, not notched, small, and free posteriorly. Vomerine teeth in two short, straight series, extending from the level of the inner margin of the choanae towards the midline of the roof of the mouth, the series separated from each other by a distance equal to the length of one series.

Coloration of Type (from Kodachrome of Fresh Specimen): Ground color gray on sides and middorsally; a fine hairline of pale brown extending from just posterior to snout to above vent, thence forking and extending to the area of the knee on the posterior face of the femur; on each side of dorsal line a zone of gray, beginning as an inverted triangle between eyes and extending to sacrum, where it gradually fades into the reddish brown of the dorsum; two poorly defined dark brown or blackish scapular spots included in this gray dorsal band; a reddish brown band, beginning at upper eyelids, extending on either side of gray dorsal band as far as groin, outlined laterally by a series of irregular black dashes and spots; snout tan, with a pair of dark brown dots on either side of dorsal hairline just anterior to eyes; sides grayish, more or less irregularly dotted and spotted with black; brachium clear and distinctly reddish brown, antibrachium and hand pale tan, dotted and flecked with black; thigh and tibia gray, with a single indistinct black bar on tibia; foot gray, mottled with black dots; plantar surface of foot dusky. A dark canthal line from naris through upper eyelid, thence posteriorly over dorsal half of tympanum, becoming diffuse; upper jaw mottled with blackish. Venter white, with scattered black chromatophores on throat and at sides of belly; ventral surfaces of thighs with black chromatophores on the large granules, giving an over-all dusky aspect.

VARIATION: The remaining two topotypes of *E. phyzelus* have the following measurements: A.M.N.H. No. 59834: female, snout to vent, 14.7; head length, 5.4; head width, 4.9; diameter of tympanum, 0.9; diameter of eye, 1.8; femur, 5.8; tibia, 6.2; length of fourth toe, 5.7; naris to eye, 1.3. A.M.N.H. No. 59833: male, snout to vent, 12.3; head length, 4.2; head width, 4.2; diameter of tympanum, 0.8; diameter of eye, 1.7; femur, 5.4; tibia, 5.5; length of fourth toe, 5.3; naris to eye, 1.2. Neither of these two specimens has the dorsal pattern of the type; both are uniformly reddish brown or grayish, with a distinct reddish tan snout. The male has the characteristic single black bar on the tibia, while the female lacks it. The female has two pairs of black dots on either side of a faintly indicated middorsal line, one pair just posterior to the eyes, the other in the scapular region. The black canthal line is better expressed in the male, extending prominently as far as the insertion of the forelimb. All three specimens are distinctly short legged and quite toad-like in aspect.

COMPARISONS: From the other members of the *dimidiatus* group, *E. phyzelus* differs as follows: from *E. dimidiatus, E. phyzelus* differs in much smaller size, distinctly short-legged appearance, and short vomerine tooth series. *Eleutherodactylus dimidiatus* is a large frog, with exceptionally elongate hind legs and feet, and, while the patterns of both it and *phyzelus* are comparable, they differ in details. From *E. emiliae, E. phyzelus* differs in smaller size and details of coloration and pattern. *Eleutherodactylus emiliae* possesses red concealed surfaces of the thighs and a black spot at the groin, and its appearance, although short legged, is more distinctly microhylid than bufonid. From the species *E. cubanus, E. intermedius,* and *E. albipes,* all of which are at present known only from the Sierra Maestra in Oriente, *E. phyzelus* differs in dorsal coloration, smaller size, and short vomerine series. Of these three species, *E. cubanus* sometimes has a middorsal light hairline, but this species is characterized also by prominent dark mottlings in the groin, which *E. phyzelus* is not known to possess.

Comparison with the remaining groups of Cuban *Eleutherodactylus* is almost unnecessary. The absence of digital discs automatically eliminates members of the *auriculatus* and *ricordi* groups, both of which have these discs relatively well developed. *Eleutherodactylus varleyi,* on the other hand, bears a striking resemblance to *E. phyzelus* in so far as dorsal pattern is concerned. The presence in this species of a pectoral vocal sac, rugose belly, and granular dorsolateral fold readily separates the two forms. I have examined in detail old specimens of *E. varleyi* from Soledad (M.C.Z. Nos. 11536–11548, M.C.Z. Nos. 11147–11149, and

M.C.Z. No. 10601, the holotype) and Matanzas (M.C.Z. No. 5001); because of the quality of preservation of these specimens, as well as their age, comparisons of color and pattern are very difficult. A single individual (Ch.M. No. 55.1.66), recently taken from Oriente, although resembling the type of *E. phyzelus* in general, differs significantly in many details, such as the absence of the light snout, the definite margins of the middorsal and dorsolateral bands, the continuation of the dark pigment anteriorly onto the snout on either side of the middorsal light hairline, and the presence of two, rather than one, bars on the tibia. However, the structural differences between *E. varleyi* and *E. phyzelus,* as noted above, are very diagnostic, despite color and pattern similarities. Lynn (1957) has recently reviewed a long series of fresh *E varleyi* from Banes, Oriente Province. Photographs of *E. phyzelus* were examined by him, and he states (in letter, April 30, 1957) that: "No specimens [of *E. varleyi*] had the broken dark lateral lines shown in your largest individual and none had a mid-dorsal stripe extending onto the head . . . I would think also that the legs of your specimens are a bit shorter than those I examined."

Remarks: The toad-like habit and absence of digital discs of *E. phyzelus* indicate that it is a ground dweller. That the three known specimens were taken in a palm-trash pile serves to confirm this supposition. The palm trash was very dry on the surface of the pile, but decayed plant matter towards the center and on the gravelly ground was somewhat more moist. No trees or vegetation were adjacent to the pile, although the habitat near by was typical of the xeric pinelands of western Cuba, with scattered pines (*Pinus tropicalis*) and the grass *Eleocharis interstincta* (see Marie-Victorin and Léon, 1944, pp. 313 and 316).

The name *phyzelus* is derived from the Greek word meaning "shy" or "cowardly," an allusion to the retiring habits of this species.

*Eleutherodactylus dimidiatus* Cope has been previously known from the provinces of Las Villas and Oriente (Dunn, 1926, p. 213). This same author mentions a record of this species by Gundlach from Rangel in Pinar del Río. Dunn apparently never saw a specimen from the westernmost province, and Stejneger (1917), reporting on the collections made by William Palmer and J. H. Riley in Pinar del Río, makes no mention of their having taken specimens in that province. A single specimen of this species was taken by William H. Gehrmann, Jr., near San Vicente, Pinar del Río Province; this individual has been compared with long series of *E. dimidiatus* available from eastern Cuba. Although the Pinar del Río specimen resembles specimens from Las

Villas and Oriente, it is nonetheless distinctive in several features, and differs from its eastern relatives in much the same way as *E. atkinsi orientalis* differs from the nominate form of that species. I therefore describe it as a new subspecies of *E. dimidiatus*.

**Eleutherodactylus dimidiatus amelasma,** new subspecies

Figure 3

TYPE: A.M.N.H. No. 59830, female, taken December 25, 1956, at the entrance of a small cave just south of San Vicente, Pinar del Río Province, Cuba, by William H. Gehrmann, Jr. Original field no. 1309.

DISTRIBUTION: Known only from the type locality, but probably occurs throughout much of Pinar del Río Province.

DEFINITION: An *Eleutherodactylus* related to *E. d. dimidiatus,* but differing from the nominate race in the bold, cream-colored, labial line extending from just anterior to the naris to the insertion of the forelimb, the almost complete absence of a black blotch or spots in the groin, absence of distinct barring of the hind limbs, more slender build, and more pointed snout.

DESCRIPTION OF TYPE: A female, with the following measurements: snout-to-vent length, 31.1; head length (tip of snout to posterior margin of tympanum), 11.0; head width, 10.2; diameter of tympanum, 1.5; diameter of eye, 3.2; femur, 17.5; tibia, 18.6; length of fourth toe, 10.7; naris to eye, 2.9. Head distinctly longer than broad; snout pointed, naris not prominent; diameter of eye larger than distance between naris and eye; interorbital distance greater (3.7) than diameter of eye; dorsum smooth, except for fine, raised, median line, and fold from posterior corner of eye, extending posteriorly for three-quarters of the length of body; upper eyelids smooth; diameter of tympanum about half of the diameter of eye; distance from eye to tympanum equal to about two-thirds of the diameter of the latter. Digital discs absent, the digits ending in a gray, terminal, unexpanded pad. Fingers long and slender, unwebbed, 3-4-2-1 in order of decreasing length; subarticular tubercles well developed. Toes very long and slender, unwebbed, 4-3-5-2-1 in order of decreasing length. Heels overlap slightly when femora held at right angles to body. Venter and throat smooth, under side of thighs smooth, becoming very granular on the posterior face. Belly disc poorly developed, with an indistinct fold between the axillae, and an equally indistinct fold across belly anterior to hind limbs; lateral margins of belly disc somewhat more prominent and incised. Tongue small, ovoid, only slightly wider at its posterior third, free posteriorly, and not notched. Vomerine teeth in two long, arched series, beginning

FIG. 3. *Eleutherodactylus d. amelasma,* new subspecies, holotype, A.M.N.H. No. 59830, from entrance of a small cave just south of San Vicente, Pinar del Río Province, Cuba. Enlarged; actual snout-to-vent length 31.1 mm.

almost at the lateral margin of the roof of the mouth, curving anteromedially, the apex of the curve just mediad to the choanae, and thence posteromedially to about the same level as the lateral end of the series; vomerine tooth series separated from each other at midline by a distance about equal to one-fourth of the length of a single series.

COLORATION OF TYPE: (Taken from Kodachrome of fresh specimen and color notes of living frog). Dorsum distinctly bicolor; a median dorsal brown band (pl. 15, C12) beginning on snout and extending to groin, the edges irregular and almost scalloped, and not bordered on the sides by black or dark brown; adjacent to this middorsal band, a

lighter (paramedian) band, golden tan (pl. 13, 17), almost metallic bronze in life, extending from snout to groin, and bordered below by a wide black band; a black canthal band, beginning on snout, extending through eye and tympanum, and above insertion of forelimb to groin, bordering paramedian band below, and separated from paramedian band by a narrow dorsolateral fold from posterior corner of eye posteriorly; both dorsal bands mottled with darker brown; median dorsal band with several discrete light bronzy spots as follows: one on the midline between the eyes, a pair between the tympana, and a second pair in the scapular region. Upper lip dark brown or black; a bold, straight-edged, cream line, beginning anterior to naris (but not on tip of snout), margined above by the black "mask" or canthal line and below by the dark labial line, extending below eye and tympanum to insertion of forelimb. One small black dot in groin on right side, none on left. Forelimb same color as paramedian band, heavily mottled with dark brown, which is concentrated into a poorly defined line on the anterior face of the brachium, and on the posterior faces of the brachium and antibrachium; fingers mottled with brown. Hind limbs slightly darker than median dorsal band, with faint indication of five or six darker cross bars on dorsal surface of thigh, and two or three darker cross bars on tibia, these latter much less clearly defined; light middorsal hairline forking above vent, and extending, as one well-defined line, onto posterior face of thigh to behind knee, and with an auxiliary short pale line, from above vent posterolaterally onto proximal third of thigh, where it becomes obscure because of pale mottling. Venter pearly white, completely unpigmented except for scattered dark brown mottling on edge of lower jaw.

COMPARISONS: The type of *E. d. amelasma* has been compared with specimens of the nominate race (type locality, eastern Cuba), as follows: *Oriente:* Pico Turquino (U.S.N.M. Nos. 137917–137933); Costa sur Baracoa (A.M.N.H. No. 6788); mountains north of Imías (M.C.Z. Nos. 22115–221159); Guantánamo, Mt. Libano, Los Hondones (U.S.N.M. Nos. 63234–63235); Guama (U.S.N.M. No. 29767); Mt. Verde (U.S.N.M. Nos. 7434, 26630, 26633–26634); Bayate, Guantánamo, Cueva de la Lechuza, San Felipe (A.N.S.P. Nos. 19482–19484). *Las Villas:* Mina Carlota, Cumanayagua (C.M. Nos. 10595–10597; M.C.Z. Nos. 11176–111200, plus 25 uncatalogued individuals); Hoyo Colorado, Trinidad Mountains (M.C.Z. Nos. 10226–10231, plus 40 uncatalogued individuals); Topes de Collantes, 1800 feet, Trinidad Mountains (A.N.S.P. No. 26041). Cope (1862, p. 151) thus described the coloration and pattern of *E. dimidiatus:* "A yellowish line on superior labial margin,

indistinct anteriorly. A black, white-bordered spot on the crural region, sometimes one on each side of the end of coccyx." In these details, the large number of specimens available from eastern and central Cuba agree with the description of the type. In none of them is the cream-colored labial line well defined and sharp-edged as in the type of *E. d. amelasma,* and in all this light line becomes obscure and diffuse anteriorly, especially with reference to its superior edge, so that in some specimens the labial line diffuses to give an indiscriminately pale loreal region. Likewise, with little exception, the groin of all eastern and central specimens is characterized by one large blotch or several dark spots, which stand out prominently against the brown ground color. In the type of *E. d. amelasma,* there is but a single tiny black spot on the right side, and none on the left; M.C.Z. No. 11178 approaches this condition, but it alone of the specimens here referred to the nominate form shows such a reduction of the black spotting in the groin. In addition, the presence of prominent bars on the thigh and tibia is characteristic of *E. d. dimidiatus;* in the type of *E. d. amelasma,* the bars are very obscure on the tibia and only moderately visible on the thigh.

The type of *E. d. amelasma* gives the impression of being a more slender frog, with a more pointed snout and longer hind legs and feet. Confirmation of these impressions must await additional material from western Cuba, in order that quantitative evaluation of them can be made.

REMARKS: The type and only specimen of *E. d. amelasma* was taken during the day under a moist palm frond on moist ground in a grassy park about 50 feet from the entrance to a small cave in the cliffs south of San Vicente. In life, the aspect of this individual was distinctly *Pseudacris*-like, reminding one of *P. brimleyi* Brandt and Walker in its habitus, metallic coloration and contrasting yellow and brown, long hind legs, and sharply pointed snout.

Apparently *E. dimidiatus* is restricted to the montane areas in Cuba, although in such regions it does not seem to occur only at high elevations. The records indicate that it has been taken in the Sierra de Trinidad, Sierra Maestra, and Sierra de Purial. Gundlach's old record from Rangel, and the present specimen of *E. d. amelasma,* indicate that the species also occurs in the Sierra del Rosario in Pinar del Río. A similar situation exists in the species *E. atkinsi,* where the nominate race is widespread in the provinces of Pinar del Río and Las Villas, whereas *E. a. orientalis* (which differs from *E. a. atkinsi* in reduction or absence of the black groin spot—much as *E. d. amelasma* differs from *E. d. dimidiatus*) occurs only in Oriente.

The subspecific name is derived from the Greek meaning "without a black spot," an allusion to the absence of the black spots or blotch in the groin in the western form.

Richard Etheridge and Thomas M. Uzzell, Jr., while stationed at the United States Naval Base, near Guantánamo Bay, Oriente Province, in the years 1951 to 1954, collected individuals of a distinctive new form of the genus *Eleutherodactylus*. This new form is a member of the *ricordi* group, but is nonetheless distinct from the other members of this group on the island of Cuba. The five specimens collected by them have been given to me for study, and I take pleasure in naming this form for Etheridge.

**Eleutherodactylus etheridgei,** new species

Figure 4

TYPE: U.M.M.Z. No. 110180, male, taken February 20, 1954, at the United States Naval Base, near Guantánamo Bay, Oriente Province, Cuba, by Thomas M. Uzzell, Jr. Original no. 1454.

DISTRIBUTION: Known only from the type locality.

DEFINITION: An *Eleutherodactylus* of the *ricordi* group with discs on fingers 3 and 4 only moderately larger than those on fingers 1 and 2, vomerine teeth in two long, almost straight series, a rugose dorsum, greenish gray or bluish white with a suffusion of tiny white dots, a poorly defined dusky interocular bar, a black bar from snout to above insertion of forelimb, anterior faces of thighs purple in life, and with a rather well-defined interbrachial black band, sometimes composed of four more or less discrete black spots, across dorsum between forelimbs.

DESCRIPTION OF TYPE: An adult male, with the following measurements: snout-to-vent length, 18.9; head length, 7.0; head width, 7.2; diameter of tympanum, 1.4; diameter of eye, 2.5; femur, 7.0; tibia, 9.0; length of fourth toe, 8.5; naris to eye, 2.4. Head width and length approximately equal; snout distinctly truncate, nares not prominent and located slightly behind angles of snout; diameter of eye about equal to distance between naris and eye; interorbital distance slightly less than diameter of eye; dorsum uniformly granular; upper eyelids indistinctly and uniformly granular; diameter of tympanum slightly more than one-half of diameter of eye; distance from eye to tympanum about half of the diameter of the latter. Digital discs present on tips of all fingers, those of the outer two fingers larger than those of inner two fingers; discs only very poorly developed on toes; disc of third finger about one-third of diameter of tympanum. Fingers relatively short, unwebbed, 3-2-4-1 in order of decreasing length, subarticular tubercles well de-

FIG. 4. *Eleutherodactylus etheridgei,* new species, holotype, U.M.M.Z. No. 110180, from United States Naval Base, near Guantánamo Bay, Oriente Province, Cuba. Enlarged; actual snout-to-vent length 18.9 mm.

veloped. Toes relatively short and slender, unwebbed, 4-3-2-5-1 in order of decreasing length. Heels overlap when femora are held at right angles to body. Venter smooth centrally, becoming granular peripherally; throat smooth; under side of thighs with pavement-like granules. Belly disc rather well developed, with a prominent fold between axillae, and a somewhat less prominent fold across belly anterior to hind limbs. Tongue ovoid, slightly notched and free posteriorly. Vomerine teeth in two long, almost straight series, extending from behind

choanae posteromedially; anterior ends of vomerine series separated from choanae by distance less than diameter of choana; medial ends of vomerine teeth separated by distance about equal to one-third of length of individual series.

COLORATION OF TYPE (FROM PRESERVED SPECIMEN): Dorsum dull tan with vermiculations and/or blotches from snout to vent; no dorsolateral stripes or lines; a dark brown to black canthal band from tip of snout through eye, above tympanum, and ending above insertion of forelimb, especially prominent and expanded between tympanum and arm insertion; a dusky band between eyes. A dark brown or black band connecting the posterior ends of the canthal band transversely across dorsum, apparently made up of two medial blotches which are fused across the middorsal line, and two lateral blotches, each fused with the posterior end of the canthal line on its own side. Upper jaw with pale labial line and scattered black chromatophores. Forearms much like back in color and pattern; digits pale. Dorsal surface of thighs marbled light and dark as dorsum; anterior and posterior faces unicolored dull purplish tan, sharply distinct from pattern of dorsal surface. Dorsal surface of crus marbled; dorsal surface of foot pale; plantar surface of foot dusky. Entire ventral surface immaculate white.

VARIATION: Four additional specimens of *E. etheridgei* are available. These may be designated as paratypes, as follows: U.M.M.Z. No. 110179 (two males), February 13, 1954, T. M. Uzzell, Jr.; U.M.M.Z. No. 110180 (one female), February 20, 1954, T. M. Uzzell, Jr.; U.M.M.Z. No. 115736 (one female), October 31, 1951, Richard Etheridge. All specimens are from the United States Naval Base, Guantánamo Bay, Oriente Province, and thus are topotypes. Means and extremes of two males are: snout-to-vent length, 18.1 (17.5–18.6); head length, 6.6 (6.5–6.6); head width, 6.5 (6.1–6.9); diameter of tympanum, 1.5 (1.5–1.5); diameter of eye, 2.4 (2.3–2.5); femur, 7.6 (7.2–7.9); tibia, 8.1 (7.4–8.7); length of fourth toe, 8.0 (7.9–8.1); naris to eye, 2.1 (2.0–2.1). Means and extremes of two females are: snout-to-vent length, 19.0 (18.9–19.0); head length, 7.3 (7.2–7.4); head width, 7.3 (7.2–7.4); diameter of tympanum, 1.5 (1.4–1.6); diameter of eye, 2.6 (2.6–2.6); femur, 8.0 (7.6–8.4); tibia, 8.7 (8.3–9.0); length of fourth toe, 8.1 (8.0–8.1); naris to eye, 2.3 (2.2–2.3).

These four specimens agree in all details with the type. All have the marbled or mottled dorsum and the interbrachial dark bar. Etheridge (*in litt.*, April 17, 1957) noted that U.M.M.Z. No. 115736, in life, had "Dorsum and legs greenish-grey with a suffusion of tiny white dots; a black bar from snout through eye to the angle of the jaw, ending above

the insertion of the foreleg. Four black spots, connected to form a band across the back, just behind the head." Uzzell (*in litt.*, April 24, 1957) stated that "The flash areas on the thighs were definitely of a purplish hue. This might have been more or less dark or intense. . . . The rest of the upper surface . . . was bluish white, with a somewhat darker mark between the eyes, and other marks on the back." These notes from life indicate that *E. etheridgei* is characterized by the greenish gray or bluish white dorsum, suffused with white dots, a dusky interorbital bar, a dark brown to black interbrachial bar, a black "mask," and anterior faces of thighs purple.

COMPARISONS: The *ricordi* group comprises 12 forms in Cuba. Of these forms, *E. etheridgei* can at once be separated from *E. a. atkinsi* and *E. a. orientalis,* as well as *E. gundlachi,* in that the new species lacks any red in the groin or on the anterior faces of the thighs. The large species from the Sierra Maestra (*brevipalmatus, sierramaestrae, turquinensis*) are all much larger than *E. etheridgei* and differ strikingly in pattern, none showing the interbrachial bar or having purple anterior faces of thighs. From *E. ricordi* and its Cuban subspecies, *E. etheridgei* differs in shorter legs and different pattern. From *E. pinarensis, greyi,* and *cuneatus* (of which only the latter is known to occur in Oriente), *E. etheridgei* again differs in pattern details and coloration. At present, I am of the opinion that *E. etheridgei* is most closely related to *E. cuneatus,* and that these two species can ultimately be separated from the *ricordi* group, along with various forms on Hispaniola and Jamaica. *Eleutherodactylus etheridgei* needs no comparison with members of the *auriculatus, dimidiatus,* and *varleyi* groups, as its characters are sufficient to distinguish it at once from the species included in these three assemblages.

REMARKS: *Elcutherodactylus etheridgei* is a terrestrial leptodactylid. The single specimen collected by Etheridge (*vide supra*) was taken "from under a wooden plank buried in the mud near a temporary drainage ditch. . . . The spot was perhaps a mile from the bay, certainly no more, and probably less than 100 feet in altitude. Between the road and a drainage ditch, there was a small clump of trees with dead grass matted underneath. The whole place looked as if every time it rained (which was often at that time of year) the ditch would overflow and cover the grass with a layer of mud. The plank was partly buried in mud." Uzzell, in reference to the four specimens collected by him, wrote (*vide supra*): "I found the specimens under small (less than a foot across) stones in an abandoned road, which was rapidly being washed away. I suspect that there was enough water under the stones

to appeal to the frogs, but it was not noticeably damp there. The stones were all exposed to direct sunlight for most of the day. I also found *Bufo peltacephalus* under some of these stones." These field notes give a concrete idea of the situation wherein *E. etheridgei* has been collected.

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